查询TF944供应商

# TF944..H

## Fast Switching Thyristor

Replaces March 1998 version, DS4281-3.2

DS4281-4.0 January 2000

### APPLICATIONS

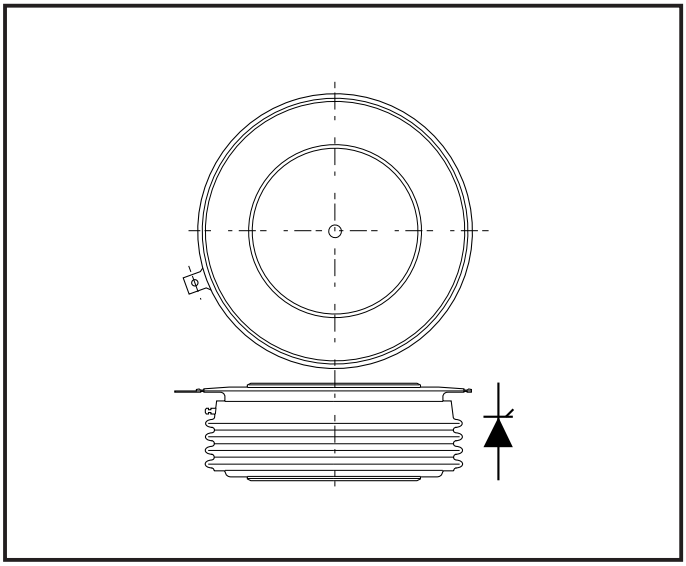
- High Power Inverters And Choppers
- UPS
- Railway Traction
- Induction Heating
- AC Motor Drives
- Cycloconverters

### KEY PARAMETERS

| | |
|---|---|
| $V_{DRM}$ | 3500V |
| $I_{T(RMS)}$ | 1350A |
| $I_{TSM}$ | 13000A |
| dV/dt | 500V/µs |
| dI/dt | 500A/µs |
| $t_q$ | 120µs |

### FEATURES

- Double Side Cooling
- High Surge Capability
- High Voltage



**Outline type code: MU169**
**See Package Details for further information.**

### VOLTAGE RATINGS

| Type Number | Repetitive Peak Voltages $V_{DRM}$ $V_{RRM}$ | Conditions |
|---|---|---|
| TF944 35H<br>TF944 34H<br>TF944 32H<br>TF944 30H | 3500<br>3400<br>3200<br>3000 | $V_{RSM} = V_{RRM} + 100V$<br>$I_{DRM} = I_{RRM} = 100mA$<br>at $V_{RRM}$ or $V_{DRM}$ & $T_{vj}$ |

Lower voaltage grades available.

### CURRENT RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|---|---|---|---|---|
| $I_{T(AV)}$ | Mean on-state current | Half sinewave, 50Hz, $T_{case}$ = 80°C | 850 | A |
| $I_{T(RMS)}$ | RMS value | Half sinewave, 50Hz, $T_{case}$ = 80°C | 1350 | A |

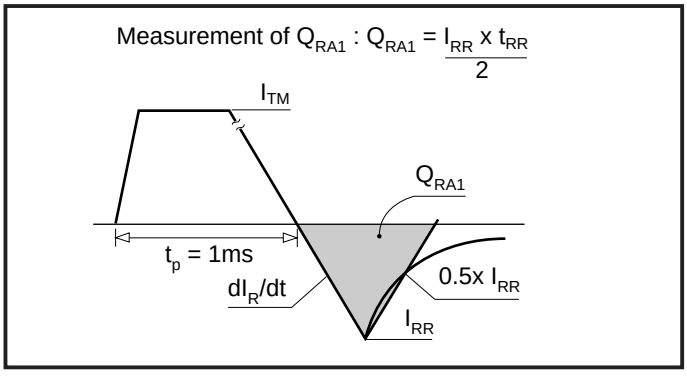
## SURGE RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|---|---|---|---|---|
| $I_{TSM}$ | Surge (non-repetitive) on-state current | 10ms half sine; $V_R$ = 0% $V_{RRM}$, $T_j$ = 125˚C | 13.0 | kA |
| $I^2t$ | $I^2t$ for fusing | 10ms half sine; $V_R$ = 0% $V_{RRM}$, $T_j$ = 125˚C | 845 x $10^3$ | $A^2s$ |

## THERMAL AND MECHANICAL DATA

| Symbol | Parameter | Conditions | | Min. | Max. | Units |
|---|---|---|---|---|---|---|
| $R_{th(j-c)}$ | Thermal resistance - junction to case | Double side cooled | dc | - | 0.02 | ºC/W |
| | | Single side cooled | Anode dc | - | - | ºC/W |
| | | | Cathode dc | - | - | ºC/W |
| $R_{th(c-h)}$ | Thermal resistance - case to heatsink | Clamping force 23.5kN with mounting compound | Double side | - | 0.006 | ºC/W |
| | | | Single side | - | 0.012 | ºC/W |
| $T_{vj}$ | Virtual junction temperature | On-state (conducting) | | - | 135 | ºC |
| | | Reverse (blocking) | | - | 125 | ºC |
| $T_{stg}$ | Storage temperature range | | | -40 | 150 | ºC |
| - | Clamping force | | | 22.3 | 24.6 | kN |

## MEASUREMENT OF RECOVERED CHARGE - $Q_{RA1}$



## DYNAMIC CHARACTERISTICS

| Symbol | Parameter | Conditions | | Min. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{TM}$ | Maximum on-state voltage | At 1500A peak, $T_{case}$ = 25°C | | - | 2.4 | V |
| $I_{RRM}/I_{DRM}$ | Peak reverse and off-state current | At $V_{RRM}/V_{DRM}$, $T_{case}$ = 125°C | | - | 100 | mA |
| dV/dt | Maximum linear rate of rise of off-state voltage | Linear to 60% $V_{DRM}$ $T_j$ = 125°C, Gate open circuit | | - | 500 | V/µs |
| dI/dt | Rate of rise of on-state current | Gate source 20V, 20Ω<br>$t_r \leq 0.5\mu s$, $T_j$ = 125˚C | Repetitive 50Hz | - | 500 | A/µs |
| | | | Non-repetitive | - | 800 | A/µs |
| $V_{T(TO)}$ | Threshold voltage | At $T_{vj}$ = 125°C | | - | 1.35 | V |
| $r_T$ | On-state slope resistance | At $T_{vj}$ = 125°C | | - | 0.5 | mΩ |
| $t_{gd}$ | Delay time | $T_j$ = 25˚C, $I_T$ = 50A,<br>$V_D$ = 300V, $I_G$ = 1A,<br>dI/dt = 50A/µs, $dI_G/dt$ = 1A/µs | | - | -* | µs |
| $t_{(ON)TOT}$ | Total turn-on time | | | - | -* | µs |
| $I_H$ | Holding current | $T_j$ = 25°C, $I_{TM}$ = 1A, $V_D$ = 12V | | 100* | - | mA |
| $I_H$ | Holding current | $T_j$ = 25°C, $I_G$ = 0.5A, $V_D$ = 12V | | 300* | - | mA |
| $t_q$ | Turn-off time | $T_j$ = 125˚C, $I_T$ = 500A, $V_R$ = 100V,<br>dV/dt = 20V/µs to 66% $V_{DRM}$,<br>$dI_R/dt$ = 50A/µs. | $t_q$ code: H | - | 120 | µs |
| $Q_{RR}$ | Reverse recovery charge | | | - | - | µC |

**Typical value.*

## GATE TRIGGER CHARACTERISTICS AND RATINGS

| Symbol | Parameter | Conditions | Typ. | Max. | Units |
|---|---|---|---|---|---|
| $V_{GT}$ | Gate trigger voltage | $V_{DRM}$ = 12V, $T_{case}$ = 25°C, $R_L$ = 6Ω | - | 3.0 | V |
| $I_{GT}$ | Gate trigger current | $V_{DRM}$ = 12V, $T_{case}$ = 25°C, $R_L$ = 6Ω | - | 250 | mA |
| $V_{GD}$ | Gate non-trigger voltage | At $V_{DRM}$ $T_{case}$ = 125°C, $R_L$ = 1kΩ | - | 0.25 | V |
| $V_{FGM}$ | Peak forward gate voltage | Anode positive with respect to cathode | - | 30 | V |
| $V_{FGN}$ | Peak forward gate voltage | Anode negative with respect to cathode | - | 0.25 | V |
| $V_{RGM}$ | Peak reverse gate voltage | | - | 5.0 | V |
| $I_{FGM}$ | Peak forward gate current | Anode positive with respect to cathode | - | 10 | A |
| $P_{GM}$ | Peak gate power | | - | 50 | W |
| $P_{G(AV)}$ | Mean gate power | | - | 3.0 | W |

## CURVES

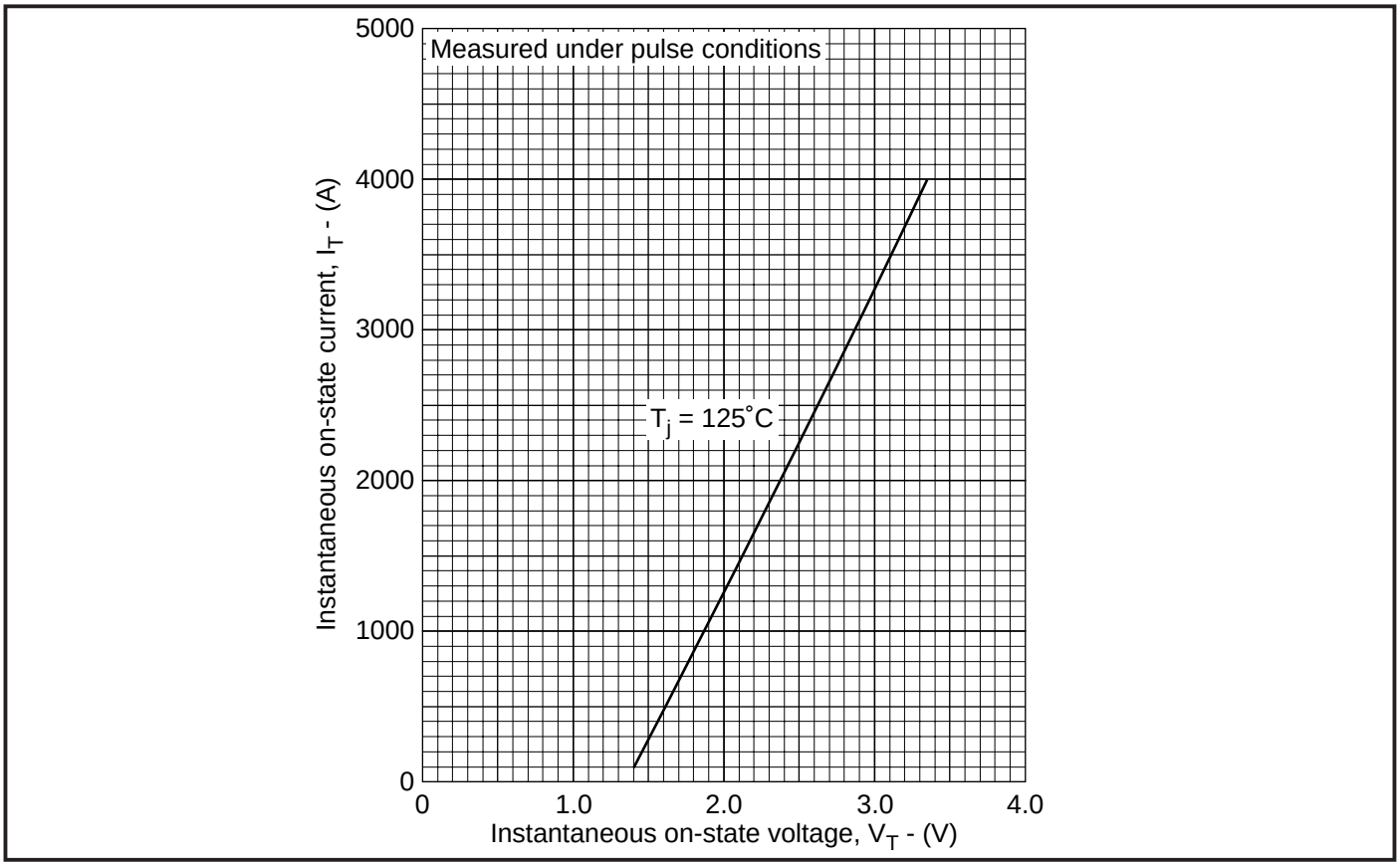



**Fig.1 Maximum (limit) on-state characteristics**

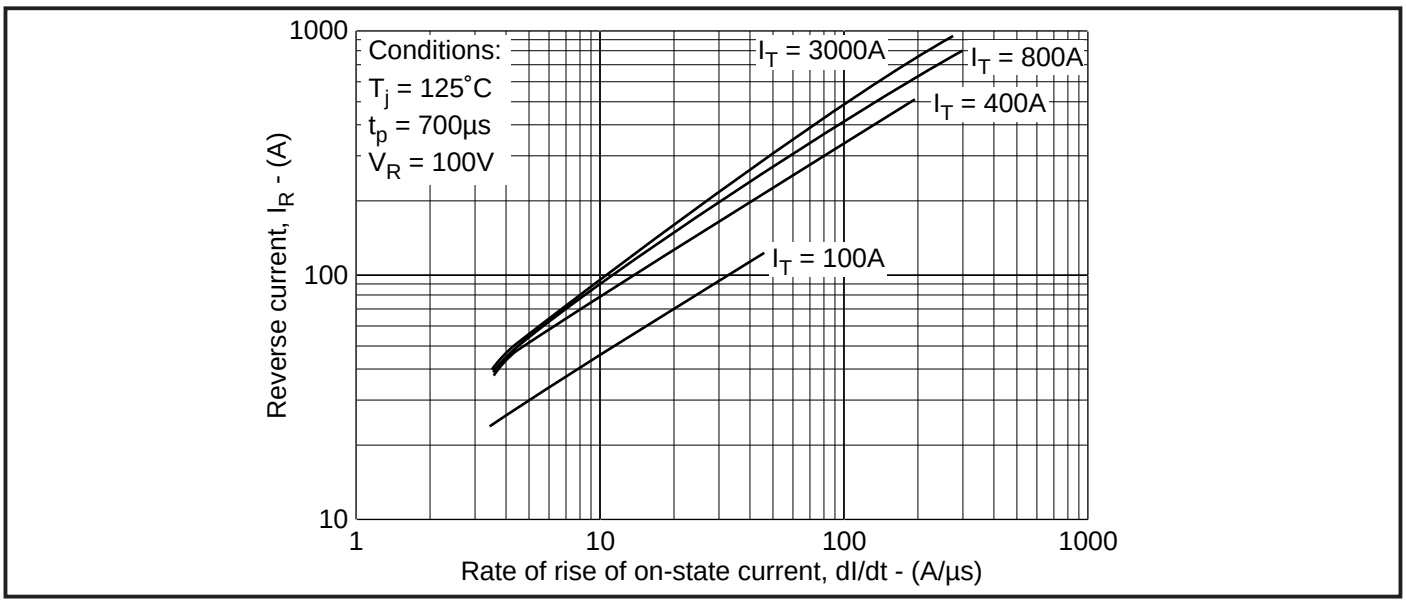



**Fig.2 Reverse current vs rate of rise of on-state current**

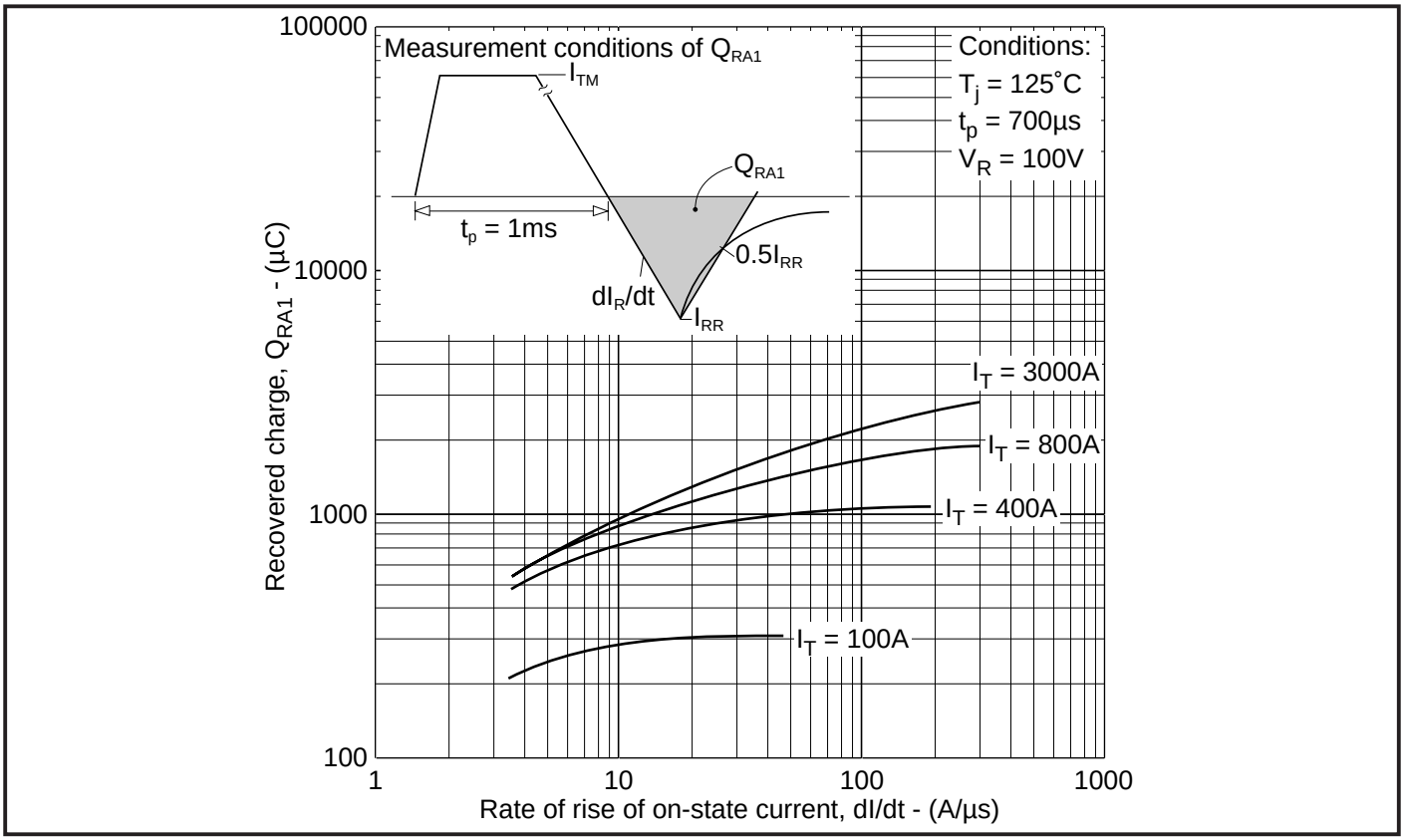
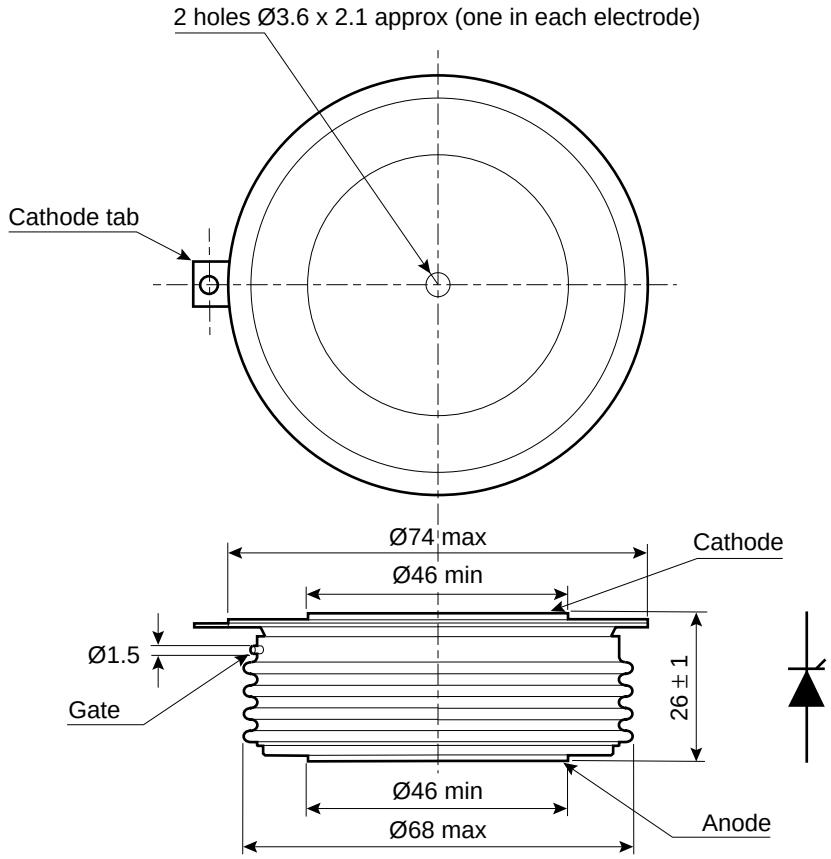



**Fig.3 Recovered charge vs rate of rise of on-state current**

## PACKAGE DETAILS

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.




Nominal weight: 500g
Clamping force: 23.5kN ±10%
Lead length: 250mm

**Package outine type code: MU169**

## ASSOCIATED PUBLICATIONS

| Title | Application Note Number |
|---|---|
| Calculating the junction temperature or power semiconductors | AN4506 |
| Gate triggering and the use of gate characteristics | AN4840 |
| Recommendations for clamping power semiconductors | AN4839 |
| The effect of temperature on thyristor performance | AN4870 |
| Thyristor and diode measurement with a multi-meter | AN4853 |
| Turn-on performance of thyristors in parallel | AN4999 |
| Use of $V_{TO}$, $r_T$ on-state characteristic | AN5001 |

## POWER ASSEMBLY CAPABILITY

The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink / clamping systems in line with advances in device types and the voltage and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group continues to offer high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the up to date CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete solution (PACs).

## DEVICE CLAMPS

Disc devices require the correct clamping force to ensure their safe operation. The PACs range offers a varied selection of pre-loaded clamps to suit all of our manufactured devices. This include cube clamps for single side cooling of 'T' 22mm

Clamps are available for single or double side cooling, with high insulation versions for high voltage assemblies.

Please refer to our application note on device clamping, AN4839

## HEATSINKS

Power Assembly has it's own proprietary range of extruded aluminium heatsinks. They have been designed to optimise the performance or our semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest Sales Representative or the factory.

DYNEX SEMICONDUCTOR

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